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Director of Environmental and  
Engineering Programs

Effective: July 25, 2002

Expires: July 24, 2003

## **Water Quality Sampling and Reporting for Construction Projects**

### **I. Introduction**

#### **A. Purpose**

This Instructional Letter provides rules and procedures for standardized water quality sampling and reporting on construction projects of the Washington State Department of Transportation (WSDOT). It directs staff to use the Water Quality Sampling and Reporting Procedures, Appendix A, attached, and provide the information to the Environmental Affairs Office (EAO) at Headquarters.

#### **B. Supersession**

This Instructional Letter supersedes and replaces the WSDOT *Highway Runoff Manual* M 31-16, Section 5-2.3.

#### **C. Background**

WSDOT currently monitors water quality on numerous construction projects, usually to satisfy permit conditions. However, there is no standard for collecting or reporting results and data is rarely used beyond the immediate project needs. This lack of standardization limits the usefulness of data and prevents coordination that could help 1) track agency performance, 2) set monitoring priorities, and 3) increase efficiency.

**D. Scope and term of this Instructional Letter**

This Instructional Letter applies to all WSDOT construction projects. Procedures are effective immediately and continue for one year, or until rescinded or extended in writing. The plan is to publish these rules and procedures in the *Highway Runoff Manual* M 31-16 within one year.

**II. References**

**A. Federal**

- Federal Clean Water Act, 33 U.S.C. §§1251-1376

**B. State**

- Washington State Water Pollution Control Act, Revised Code of Washington (RCW) Chapter 90-48
- Water Quality Standards for Surface Waters of the State of Washington, Washington Administrative Code (WAC) 173-201A
- *Highway Runoff Manual* M 31-16, WSDOT

**III. Rules and Procedures**

**A. Identifying Construction Projects for Water Quality Sampling**

Region environmental offices and Region construction offices will coordinate to determine which projects require monitoring by water quality sampling based on the following:

- At least twenty percent of projects that meet one of the risk conditions listed below will be monitored
- Not less than one project will be monitored

**Risk Conditions:**

**1. In-Water Work**

Projects that require work below the ordinary high water mark of state waters.

## **2. High-Risk Erosion Control Projects**

Projects that involve more than five (5) acres of soil disturbance, and discharge to state waters within 300 feet of the project, and meet at least three of the four following characteristics:

- a) More than 50% of the site consists of soils in Hydrologic groups C and D. This information is obtained from NRCS county soil surveys.
- b) The project involves wet-season work or lasts more than one year.
- c) Cut/fill slopes exceed more than 50 feet in length.
- d) There are active seeps or shallow groundwater on project site.

## **3. Moderate Risk Erosion Control Projects**

Projects that do not meet the criteria for high risk but involve soil disturbance and discharge concentrated flows to regulated water bodies.

## **B. Water Quality Sampling Instructions for Projects**

Projects that require monitoring will use the sampling and reporting protocols appropriate for the project type for turbidity, pH\*, and other parameters outlined in the Water Quality Sampling and Reporting Procedures, Appendix A, attached.

\*pH is the inverse log of the hydrogen ion concentration

## **C. Additional Project Water Quality Sampling**

This Instructional Letter does not prohibit additional monitoring on any project. All projects that monitor water quality, however, either as a permit condition or voluntarily, must follow the procedures detailed in Appendix A.

If sampling of other parameters is required, contact the Headquarters Water Quality Program at 360-570-6651 or 360-570-6648 for guidance on implementation.

**D. Where to Submit Water Quality Sample Results**

Submit all water quality sample results by e-mail to the designated environmental office contact for your Region and the Headquarters Environmental Affairs Office (EAO) Water Quality Program. To reach the Headquarters Water Quality Program call 360-570-6648 or 360-570-6651.

**IV. Appendices**

- A. Water Quality Sampling and Reporting Procedures**
- B. Daily Data Record Form**
- C. Summary Report Form (Example)**
- D. Monitoring Report Form (Example)**

***Alternate Formats:*** Persons with disabilities may request this information be prepared and supplied in alternate formats by calling the WSDOT ADA Accommodation Hotline collect 206-389-2839. Persons with hearing impairments may access WA State Telecommunications Relay Service at TT 1-800-833-6388, Tele-Braille 1-800-833-6385, or Voice 1-800-833-6384, and ask for connection to 360-705-7097.

## **Scope**

The following procedures have been developed as minimum requirements for use with Washington State Department of Transportation (WSDOT) projects involving in-water work and erosion control. These procedures have been developed to document compliance with: 1) the State of Washington surface water quality standards (chapter 173-201A WAC), 2) other local, state, and federal permit conditions, and 3) Implementing Agreement conditions. These procedures will also be used to evaluate the effectiveness of Best Management Practices (BMP's). Projects that require additional permit conditions can incorporate additional sampling parameters into these protocols.

### **I. Standard Sampling Equipment**

All regions will use the following water quality sampling equipment. This equipment was selected for the purpose of legal compliance and as such should be maintained for the purpose of documentation of project conditions/legal records of WSDOT construction activities.

Turbidity	Hach Model 2100 p portable turbidimeter with sampling bottles
pH and Temperature	Hach Model SensION portable pH meter
Water Flow Meter	MJP Geopacks ZMFP 51 or equivalent
Water Sampling Rod & Cup	(12' extendable)
Rain Gauge	Tru-Check brand or equivalent installed on-site
Field Notebook	For recording data/observations

### **II. Pre-Sampling Procedures**

Prior to water quality sampling in the field the responsible WSDOT personnel shall perform the following procedures:

**A. Review Important Project Information and Assess Risk**

Review project maps, project definition, and schedule to understand when and where construction activities have the greatest potential to impact specific water quality parameters. Standard activities and project conditions that require sampling are as follows.

1. **In-water work.** Such projects require work below the ordinary high water mark of state water bodies.
2. **High-risk erosion control projects.** Such projects involve more than 5 acres of soil disturbance, discharge to state waters within 300 feet of the project, and meet at least three of the four following characteristics.
  - a) More than 50% of the site consists of soils in Hydrologic groups C and D.
  - b) The project involves wet-season work or lasts more than one year.
  - c) Cut/fill slopes exceed more than 50 feet in length.
  - d) There are active seeps or shallow groundwater on project site.
3. **Moderate-risk erosion control projects.** Earthwork projects that discharge concentrated flows to state water bodies.

**B. Verify Classification and Water Quality Standards**

Verify the classification and water quality standards for potentially impacted water bodies according to the State of Washington surface water quality standards (chapter 173-201A WAC). Read the local, state, or federal permit(s) in the construction document/contract to ensure a good understanding of any additional water quality requirements of the project.

### C. Establish Sampling Locations

Establish sampling locations to determine background, outfall, and downstream water quality conditions. Sites with multiple outfalls or stream crossings may require numerous sampling stations. Locate sampling points according to the following criteria:

1. **Background condition.** Locate background sampling locations where water bodies enter the right-of-way, or 100 feet upstream from the outfall, whichever is closer.
2. **Discharge water quality.** Locate sampling point at the outfall to the receiving water.
3. **Downstream impacts.** For projects involving in-water work where a mixing zone is allowed, use the flow meter to determine downstream sampling distances as defined in the *Implementing Agreement Between the Washington State Department of Ecology And the Washington State Department of Transportation Regarding Compliance with the State of Washington Surface Water Quality Standards*.
4. **All other projects.** For all other projects, sample where the water body leaves the right-of-way, or 100 feet from the outfall, whichever is closer.

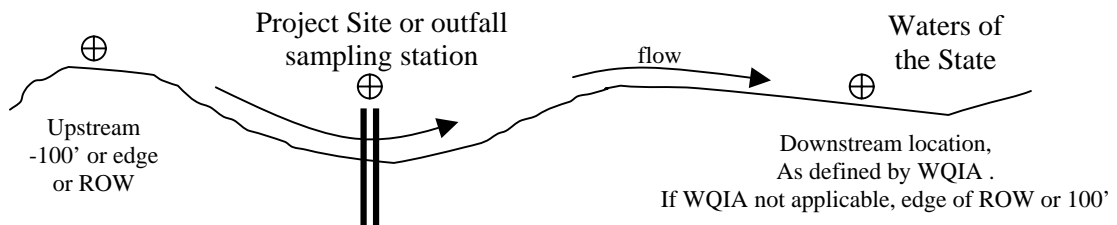


Figure 1 - General Layout of Typical Water Quality Station Locations

**D. Create Base/Site Map**

Develop a relatively small-scale map depicting the project; sampling locations; and major water, land, and road characteristics. Keep the map in the field notebook so that other staff can understand the locations and access the sampling stations.

**E. Establish a Sampling Schedule**

Establish a sampling schedule to ensure that monitoring is conducted during the high-risk activities and construction periods. Follow the minimum sampling schedules for the following projects types.

1. **In-water work.** Sample daily during in-water work activities.
2. **High-risk erosion control projects.** Sample daily during 1) all storm events that cause discharges to regulated water bodies and 2) all other intentional discharges to surface waters including, but not limited to draining of ponds, vaults, or footings, flushing of water lines, etc. During temporary suspensions of construction, monitoring will also be suspended if samples from three consecutive storm events meet water quality standards.
3. **Low- to moderate-risk erosion control projects.** Sample daily during storm events that exceed 0.5 inches of rainfall within 24 hours, while the project is active.

**F. Contingency Sampling**

Variations from standard procedures may be required depending on exact field conditions and other project considerations. Establish procedures to adapt to unanticipated events such as severe storms, schedule adjustments, modified construction techniques, contractor, etc. Clearly record any modifications to the procedures in the field notebook. Following any water quality violation, additional sampling will be needed to verify when site runoff has returned to compliance.

**G. Calibration of Equipment**

Calibrate equipment according to manufacturers' recommendations and according to their specified schedule. Calibration frequency must follow the manufacturers' recommendations at a minimum for data to be legally defensible. Additional calibrations should be immediately performed if data appears suspect.

## **H. Field Equipment Checklist**

- ☐ Sampling Cup/Rod or hip waders
- ☐ Turbidity equipment (check batteries and sampling supplies)
- ☐ pH equipment (check batteries and sampling supplies)
- ☐ De-ionized water for rinsing equipment (distilled)
- ☐ Water flow meter (In-water work only)
- ☐ Long survey stakes, hammer, and marking pen (initial set up only)
- ☐ Rain gauge
- ☐ DOT approved safety vest & hardhat
- ☐ Camera
- ☐ Field notebook for recording sampling data and field conditions
- ☐ Cellular Phone and contact phone numbers

## **III. Sampling Station Setup**

When setting up sampling stations:

- Mark all sampling station locations with clearly labeled survey stakes.
- Photograph each sampling station for future reference and reporting. Picture(s) should show a good relationship of the project, sampling station and surrounding environment.
- If sampling outside of WSDOT right-of-way, survey stake locations should be within WSDOT right-of-way with direction and distance labels to the exact sampling point locations. Record the exact sampling point location in field notebook.

## **IV. Pre-Construction Baseline Sampling**

Prior to beginning compliance monitoring, baseline water sampling is required to establish background water quality characteristics above and below the site. It is important to show the existing water quality conditions both above and below the site prior to construction as natural stream bank erosion or preexisting stormwater outfalls from adjacent properties may cause differences between proposed monitoring points. Whenever possible, baseline monitoring should be performed during a rainstorm.

## **V. Sampling Procedures**

The following sampling procedures must be used:

- Sampling shall occur from the most downstream station first and work upstream to the upper most station to avoid contamination. Testing of samples should occur at the designated sampling station whenever possible.
- Collect samples from as close to the center of the water body as practical. Use the sampling rod if necessary.
- Fill the sampling bottle (downstream) at least once prior to collecting the sample to remove possible contaminants. Shake the sample prior to turbidity testing.
- pH sampling should occur prior to turbidity as temperature affects pH.
- Follow the manufacturers' recommendations for equipment operations.

## **VI. Sampling Information**

The following information shall be recorded in the field notebook for each sampling event on the attached Daily Data Record Form:

- The date, time and location of the sample.
- Project name and contract number.
- Personnel who collected the sample.
- Field conditions (weather, temperature, pertinent construction activities, note any prior disturbance of the water body, etc.)
- The testing results for measured parameters.
- Date and time of the last calibration of sampling equipment.
- Notes summarizing critical activities, unusual conditions, corrective actions, whether or not photographs were taken as supporting documentation, etc.

## **VII. Office Data Recording And Analysis**

All project water quality monitoring forms, maps, and pictures of the sampling stations are kept in a single file in the project office for easy access for compliance inspections or peer review of the documentation. Standard forms for recording and reporting monitoring results can be downloaded from the Headquarters Water Quality Program website. These forms, in Microsoft Excel format, summarize data for each point of compliance and generate graphs for monthly reports.

Initial data analysis occurs in the field comparing results with water quality standards in the Daily Data Record Form. The summary report data and graphs should identify trends and evaluate the effectiveness of BMPs.

## **VIII. Reporting Sampling Results & Compliance Issues**

If sampling results indicate that a project is not in compliance of water quality standards or permit(s) conditions, the following procedures should be followed:

- Note the non-compliance issue, the results, the duration of the non-compliance issue, time of day, and characteristics of the activity causing the non-compliance.
- Immediately notify the Project Engineer or appropriate WSDOT contract inspector, and the regional environmental office to 1) inform them of the situation and possible consequences, and 2) discuss potential corrective actions. The designated point of contact as determined within each region will report the incident and the effectiveness of corrective actions to regulatory agencies.
- Notify Headquarters Water Quality Program.
- If a spill is observed while sampling, immediately report it to the lead inspector, project engineer, and regional environmental contact so that legal reporting requirements can be met and trained cleanup staff can be contacted, if necessary.

Send electronic copies of summary report data and graphs to the Project Engineer, the regional environmental office, and the Headquarters Water Quality Program on a monthly basis. The report should include a short narrative whenever water quality standards were not met and what actions were taken to correct problems. The PE-designated contact person shall send results to regulatory agencies whenever standards are not met and as required by permit.

## IX. Water Quality Sampling Equipment Information

Company	Product	Approximate Cost
<b>Hach Company</b>	2100 p Turbidimeter	\$800.00
(970) 669-3050	SensION1 pH and Temperature meter	\$500.00
<a href="http://www.hach.com">www.hach.com</a>		

**Appendix B**  
**Daily Data Record Form**

**Daily Data Record Form**

Project \_\_\_\_\_  
Contract Number \_\_\_\_\_  
Name \_\_\_\_\_  
Date \_\_\_\_\_

Weather \_\_\_\_\_  
Precip. (to nearest 0.1 inches) \_\_\_\_\_  
Last Calibration \_\_\_\_\_

**Instructions**

Use this form to record turbidity and, if necessary, pH values in the field for each outfall. When complete, enter data into Summary Report Form in MS Excel. Graphs will be automatically generated in Monitoring Report Form. Both forms can be downloaded from the Headquarters Water Quality Program website.

**Contact Names and Numbers if Compliance Problems Observed or Help is Needed**

Project Engineer \_\_\_\_\_  
Lead inspector \_\_\_\_\_  
Regional Environmental Contact \_\_\_\_\_  
Headquarters Water Quality Program- 360-570-6648

Outfall Label	Water Body	Location	Time	Turbidity	pH	Notes
		Upstream				
		Outfall				
		Downstream				
		Upstream				
		Outfall				
		Downstream				
		Upstream				
		Outfall				
		Downstream				
		Upstream				
		Outfall				
		Downstream				
		Upstream				
		Outfall				
		Downstream				
		Upstream				
		Outfall				
		Downstream				

**WAC 173-201A Standards**

**Turbidity - Class AA and A Waters**

shall not exceed 5 NTU when background turbidity is 50 NTU or less, or have more than a 10% increase in turbidity when background turbidity is more than 50 NTU.

**Turbidity - Class B and C Waters**

shall not exceed 10 NTU when background turbidity is 50 NTU or less, or have more than a 20% increase in turbidity when background turbidity is more than 50 NTU.

**pH - Class AA, A, and B Waters**

shall be within the range of 6.5 to 8.5 with a human-caused variation within the above range of less than 0.2 units for Class AA or 0.5 units for Class A and B.

**pH - Class C Waters**

shall be within the range of 6.5 to 9.0 with a human-caused variation within the range of less than 0.5 units.

- 1) Use following spreadsheet to compile compliance data collected on Daily Data Record Form. Add rows as needed, delete unused columns if monitoring of both parameters is not required. Graphs will be automatically updated as data is entered on Monitoring Report Form worksheet (label figures as required).
- 2) Each summary report corresponds to one outfall. Copy this template and re-label if the project involves multiple outfalls.
- 3) When reporting compliance, send in completed tables and graphs with a brief cover letter explaining the data if necessary.
- 4) When the report is submitted, send an electronic copy of data and graphs to the Environmental Affairs Office's Water Quality Program at [mooreda@wsdot.wa.gov](mailto:mooreda@wsdot.wa.gov).

Project \_\_\_\_\_  
 Period of Data \_\_\_\_\_ to \_\_\_\_\_  
 Name \_\_\_\_\_  
 Outfall \_\_\_\_\_  
 Water Body \_\_\_\_\_

[illegible]

## Monitoring Report Form

Project \_\_\_\_\_  
 Period of Data \_\_\_\_\_ to \_\_\_\_\_  
 Name \_\_\_\_\_  
 Outfall \_\_\_\_\_  
 Water Body \_\_\_\_\_

### Instructions

Data entered in Summary Report Form is automatically graphed below, corresponding to one outfall. For multiple outfalls, make copies of Summary and Monitoring Report forms and enter data for each outfall. When complete, send copies of data and graphs to Headquarters Water Quality Program at mooreda@wsdot.wa.gov.

### Narrative

*Provide a short summary of the data including how many sampling events took place, how many non-compliance events occurred, and what was done to correct any instances of non-compliance.*

